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ABSTRACT

This study approaches the issue of quality in the teaching force using a microeconomic framework that applies the concept of "opportunity cost." As teaching is a low-paid profession, accepting a teaching position may be associated with high opportunity costs (foregone benefits) for more academically talented college students because they could enter other occupations that offer higher salaries and better working conditions. This study examines the extent to which the perceived pecuniary and nonpecuniary opportunity costs associated with entering teaching affect the quality distribution of the teaching force. Methodology involved the development of a path model of occupational choice, administration of a survey to 532 college students, and path analysis. Findings suggest that the perceived pecuniary and nonpecuniary opportunity costs associated with entering teaching are causally related to the quality problem. Opportunity costs provide an important theoretical reference point for understanding the issue of quality. Therefore, teacher policy should focus on reducing the opportunity costs of entering teaching by increasing the overall level of teacher salaries and improving the working conditions in order to attract more academically able graduates to the teaching profession. Four figures and three tables are included. (Contains 38 references.) (LMI)

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A MICROECONOMIC APPROACH TO THE ISSUE OF QUALITY IN THE TEACHING FORCE

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Abstract

This study approaches the issue of quality in the teaching force using a microeconomic framework applying the concept of "opportunity cost." As teaching is a low-paid profession, accepting a teaching position may be associated with high opportunity costs (foregone benefits) for more academically talented college students because they could enter other occupations that offer higher salaries and better working conditions.

The purpose of the study is to examine the extent to which the perceived pecuniary and nonpecuniary opportunity costs associated with entering teaching affect the quality distribution of the teaching force. A path model of occupational choice was developed, empirical data were collected by a questionnaire survey to 532 college students, and a path analysis was used to test the hypotheses of the model.

The findings suggest that the perceived pecuniary and nonpecuniary opportunity costs associated with entering teaching are causally related to the quality problem. Opportunity costs provide an important theoretical reference point for understanding the issue of quality. Therefore, teacher policy should focus on reducing opportunity costs of entering teaching by increasing the overall level of teacher salaries and improving the working conditions in order to attract more academically able graduates to the teaching profession.

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The Issue of Quality in the Teaching Force

How to improve the quality of teaching has been a long-standing concern of the public, educators, and educational researchers. Numerous studies, based on the approaches of psychology, organizational theory, and sociology, have addressed the issue of how to improve teaching quality. For instance, many have advocated that the way to improve teaching quality is to improve teacher education programs or reinforce certification and selection procedures (Burdin,1981; Carnegie Forum on Education and the Economy, 1986; Medley,1981).

These proposals are important in order to improve the quality of teaching because they could make a degree of difference. However, one limitation of these current efforts is that they focus only on the current, existing pool of talent. They do not explicitly assume schools could be staffed by different and more qualified teachers from a better talent pool.

That high-quality teaching begins with a high-quality teaching force should not be overlooked. If the high quality of the teaching force is not guaranteed, high quality of teaching seems less likely--despite various efforts that intend to facilitate good teaching as suggested above. Because the quality of the teaching force itself is a type of basic material, it may limit the potential efficacy of all those efforts. A high-quality teaching force may not necessarily be a sufficient condition for a high-quality teaching performance, but it must be a necessary condition for quality teaching.

A few studies in the early 1980s (Darling-Hammond, 1984; Vance & Schechty, 1982; Weaver, 1983) provide useful information on the quality status of the U.S.

teaching force. The consistent findings of these studies suggest that most teachers are drawn from lower-academic ability groups than other college graduates and that the teaching profession fails to attract and retain those with higher-academic ability. For instance, according to a descriptive analysis of the National Longitudinal Study of 1972 High School Seniors by Vance and Schlechty (1982), 73.9% of recruits to education came from the lower three of all five ranks on the verbal Scholastic Aptitude Test (SAT). The results confirm the continuous skepticism within the U.S. concerning the quality of the teaching force. In contrast, most teachers in Japan are drawn from the top 30% of the college graduating classes (Wray, 1989). The U.S. pattern is discouraging and astonishing.

Some critics suggest that academic ability, i.e., standardized tests such as the SAT, is a poor proxy measure for teacher quality. They argue that evidence does not support the theory that the most academically able people can be the best teachers (Shields & Daniele, 1981). It is true that researchers must be careful using academic ability as a proxy of quality, because academic ability is one measure of teacher quality; however, it is not the only measure or the most important.

Nevertheless, it is noteworthy that academic ability has been and continues to be a useful proxy for assessing the quality or potential of individuals. Standardized tests have been one of the most commonly-used instruments to measure academic ability to date (Mehrens, 1981). Although academic ability measures do not fully predict teaching performance, it seems reasonable that competence in teaching requires a level of academic ability that is at least equal to, if not superior, that of the

average college student (Vance & Schlechty, 1982). Because teaching is a complex process, it seems unlikely that excellent education could be performed by people whose intellectual capacities are below average.

Despite the controversy concerning how to measure quality, it is generally agreed that the quality of the teaching force is important to the quality of the educational experience of children (Darling-Hammond, 1984; Fox, 1987; Murnane, Singer, & Willett, 1989; Skyes, 1983; Weaver, 1983). In short, the quality of teaching staff is an important element in determining the level of learning among students (Alexander & Monk, 1987); also, the quality of education is greatly influenced by the quality of teachers (Dean, 1984). If teacher quality is a crucial element in achieving educational excellence, the described indicator of low quality is an important issue. The current status of academic ability in the teaching force appears to be a critical obstacle in accomplishing quality education.

Rationale for a Microeconomic Framework

As the reality of the quality problem of the U.S. teaching force is examined, the question of why the more academically able students do not enter the teaching profession is raised. However, it seems that insufficient attention has been paid to fundamental dimensions of this topic. Rickman and Parker (1990) point out:

> It is surprising that, given the critical role of teachers in the educational process, commissions have not addressed basic questions such as who chooses to become a teacher, who exits the teaching profession, who remains as a career teacher, and the economic forces governing those decisions (p. 73).

Few studies systematically have examined the reasons that the more academically able college graduates do not enter the teaching profession (Murnane et al., 1989). Most studies on the teaching force have been oriented toward quantity issues such as teacher turnover rates and the possible shortage problem in the teacher labor market (Guthrie & Zusman, 1982). Consequently, recent calls for increasing teacher salaries and improving working conditions as policy solutions to the quality problem lack a conceptual framework for guiding their development and implementation. Some plausible explanations for the quality problem in the teaching force may be related to the incentive attributes of the occupation.

Low salaries as a reason. Teaching is generally recognized as one of the least profitable occupations. Teacher salaries, when controlled for inflation, have been consistently low compared to other professional salaries throughout the last several decades. In 1991, for example, the average starting salary of U.S. teachers was $22,830 (National Center for Education Statistics, 1992), which is the lowest among salaries paid for college-graduated employees in all other private industries (U.S. Bureau of the Census, 1992). According to the occupational profitability comparison (Dresch, 1986), the relative profitability of teaching is extremely low. In Dresch's analysis of 1981 data, the professional, technical, and managerial (PTM) occupations, which include teaching, usually offer more than $1,000 to $2,000 annually than non-PTM occupations. Nonetheless, teachers' average annual salary is $2,707 less than that of nonprofessional, technical, and managerial occupations.

The observation that teacher salaries are relatively low, coupled with the issue of teacher quality, raises the question of a link between the two. However, there is no evidence to whether the relatively low salary level of teaching is associated with the low quality of the teaching force. If a linkage does exist, why and through what mechanism does the low income characteristic of teaching affect the quality of the teaching force?

Nonpecuniary suggestions. Poor and stressful working conditions inherent in teaching have been suggested as a reason for the low teacher quality (Bruno, 1986; Carnegie Forum on Education and the Economy, 1986; Huston, 1988; Weaver, 1983). However, inquiries continue in the arena of nonpecuniary explanations. Do these working conditions of teaching really affect the quality distributions of the teaching force? No evidence has been provided about the relationship between working conditions and the decisions of college students to enter the teaching profession.

In order to systematically investigate the described questions regarding the reasons for the teacher quality problem, the present study attempts to employ an economic framework, more precisely, a microeconomic framework applying the concept of "opportunity cost." Economic theory provides a conceptual, as well as an analytic, framework for examining the policy initiatives concerning salaries and working conditions. According to Becker (1976), economic approach is a useful tool for the research problem regarding the wide range of human behavior including occupational choice.

Opportunity cost in economics refers to the disadvantages or foregone benefits caused by choosing one alternative over another (Kohler, 1986). Individuals' opportunity cost of entering teaching indicates foregone pecuniary and nonpecuniary benefits incurred by choosing teaching rather than their best occupational alternatives. If college graduates choose teaching as their occupation, they will encounter foregone benefits as well as benefits of their chosen occupation. These foregone benefits may be a higher salary, a nice office, or higher social esteem of an alternate occupation. Since these benefits are forfeited, the loss is called "opportunity cost."

Because teaching is a low-paid profession, accepting a teaching position may be associated with high opportunity costs (foregone benefits) for more academically talented college students because they could enter other occupations which offer higher salaries and better working conditions. Although economic analysis is often confined to pecuniary factors, it embraces the nonpecuniary aspects as well the pecuniary aspects. Murnane and colleagues suggested that the concept of opportunity cost could be useful in explaining the quality problem for the teaching occupation (Murnane & Olsen, 1989; Murnane et al., 1988, 1989). The microeconomic framework of this study is powerful for the following reasons.

First, opportunity cost, which is a fundamental microeconomic concept, may be particularly useful in explaining the reasons for the quality problem. Adopting the concept of opportunity cost, the quality problem in the teaching force can be explained by two patterns: (a) Individuals who possess high academic ability encounter high

opportunity cost if they choose the teaching occupation; and (b) individuals who encounter high opportunity cost are unlikely to enter the teaching occupation.

The human capital perspective formulated by economists Schultz (1961), Becker (1975), and others provides a theoretical foundation to explain why individuals who possess high academic ability may encounter high opportunity cost. "Human capital" indicates skills and knowledge that are achieved through education, training, and experiences. From the human capital perspective, the more human capital individuals possess, the more earnings and other benefits they are expected to attain from their occupational endeavors (Becker, 1975; Otto, CallVaughn, & Spenner, 1981; Rickman & Parker, 1990; Schultz, 1961).

Academic ability, as expressed in standardized test scores, grade point average, and reputation of institution attended, has been used as an index of human capital in employment. Academic ability is apparently an important variable to determine the opportunity cost of an individual (James, Alsalam, Conaty, & To, 1989; Wise, 1975). Thus, for those who possess high academic ability, the opportunity cost of entering teaching may be great because they have the potential of earning more from an alternative rather than a teaching occupation. For those whose academic ability makes them less competitive, the opportunity cost of teaching may not be as high because they are less likely to attain substantially more from other occupational alternative occupations. Thus, the concept of opportunity cost and the related notions of utility maximizing behavior and human capital may be a powerful mechanism to explain the reason for the quality problem in teaching.

The assumption of "utility maximizing behavior" in human beings may explain the reason why individuals who encounter high opportunity cost do not enter the teaching occupation. "Utility" is the satisfaction a person derives from her or his occupation through either pecuniary (monetary) rewards or nonpecuniary rewards (Ehrenberg & Smith, 1988; Kohler, 1986). When human beings choose their occupations, according to this theoretical framework, they are believed to do so in a rational manner that maximizes benefits and minimizes costs (Berger, 1988; Theobald, 1990). Consequently, it is plausible that individuals who encounter high opportunity cost may avoid entering teaching unless their interests in teaching are extremely high, thus, bearing the higher cost.

Second, the quality problem in the teaching force should be understood in the context of occupational choice. This approach is important and logically proper because the quality distribution of the teaching force is an aggregated consequence of the occupational choices by individuals. The supply of the teaching force is based on the occupational choice of individuals (Weaver, 1983). Yet, there is little knowledge about how college students decide to pursue teaching careers, how teachers decide to continue to teach, and what factors affect teachers' decisions to leave or return after an interruption (Murnane et al., 1988, 1989).

It is assumed in the literature that there are many factors in occupational choice: (a) pecuniary, such as salary and fringe benefits; (b) nonpecuniary, such as working conditions, social esteem of the occupation, and job opportunity; and (c) personal, such as major area, aptitude, academic ability, interest, and value system

(Davis, 1965; Ginzberg, Ginsburg, Axelrad, & Herma, 1963; Hoppock, 1976; Otto et al., 1981).

One of the myths concerning the occupational choice of teachers is that most of them become teachers regardless of the pecuniary and nonpecuniary benefit characteristics of the occupation; that is, they love children and enjoy teaching. If these types of personal factors dominated the occupational choice, salary and working conditions would have nothing to do with the quality distribution of the teaching force. Pecuniary and nonpecuniary factors, or opportunity costs as framed in this study, may influence occupational choice significantly, although that influence is expected to be moderated by personal factors. Rather than domination by one factor, multiple interacting factors are expected to influence occupational choice.

Third, the presence of economic forces operating in the process of occupational choice has been recognized in the literature (Berger, 1988; Kohler, 1986); however, it has not been examined in connection with the quality problem. Only recently, a few studies have paid attention to its importance in relation to the quality problem (Murnane et al., 1988, 1989; Rickman & Parker, 1990; Weaver, 1983). Changes in salaries caused by economic forces in the teacher labor market may determine the quality as well as the quantity of supply. According to Weaver (1983), labor market dynamics make talent eventually flow to opportunity by influencing institutional and individual behaviors.

Fourth, previous fragmentary explanations of the quality problem in the teaching force should be incorporated into a model. Opportunity cost should include both

pecuniary and nonpecuniary dimensions because the low salary level, as well as poor working conditions of the teaching occupation, are plausible explanations for the quality problem. Although considerable difficulties are acknowledged in estimating the magnitude of nonpecuniary costs, nonpecuniary explanations should not be underestimated because working conditions may be as important as salary in attracting high quality people (Bruno, 1986).

Further, pecuniary and nonpecuniary explanations should be integrated because interactions and trade-offs between the pecuniary and nonpecuniary benefits or costs are likely to occur in the process of occupational choice. Even though the overall opportunity cost of teaching for individuals who possess high academic ability is predicted to be high due to low salary level, there may be important nonpecuniary benefits that offset low salaries. For example, if more than 2 months' school vacation is perceived as an important benefit, trade-offs between less salary and more vacation time may occur. The magnitude of the opportunity cost may be adjusted after trade-offs between pecuniary cost and nonpecuniary benefit. Therefore, the microeconomic framework of this study is appropriate for examining the issue of quality.

Conceptual Framework and Method

The purpose of this study is to examine the extent to which the perceived pecuniary and nonpecuniary opportunity costs of entering teaching affect the quality distribution of the teaching force. The study intends to develop a theory concerning the issue of quality in the teaching force, which expands an explanation for the

reasons that teaching is unable to attract the more academically able college students. This theory is expected to provide a conceptual and empirical framework for recent calls for increasing teacher salary and improving working conditions as policy solutions. In addition, the study intends to provide policy implications concerning the strategies for improving the quality of the teaching force.

For this purpose, the study hypothesizes that the perceived pecuniary and nonpecuniary opportunity costs of entering teaching help explain why teaching is unable to attract the more academically talented college graduates. More specifically, two hypotheses are examined: (a) College students' academic ability will affect the perceived pecuniary and nonpecuniary opportunity costs, suggesting that the more academically able students will confront higher perceived pecuniary and nonpecuniary opportunity costs; and (b) the perceived pecuniary and nonpecuniary opportunity costs will affect college students' occupational choice, suggesting that the higher the perceived pecuniary and nonpecuniary opportunity costs, the less likely college students will choose teaching as their occupation.

In order to examine the hypotheses, the path model of occupational choice was developed on the basis of the knowledge reviewed in the literature. The model consists of seven variables: (a) academic ability, (b) sex, and (c) subject specialty as antecedent variables; (d) pecuniary opportunity cost and (e) nonpecuniary opportunity cost as mediating variables; (f) interest/values as a moderating variable; and (g) occupational choice as an outcome variable. Figure 1 represents a conceptual model of the study.

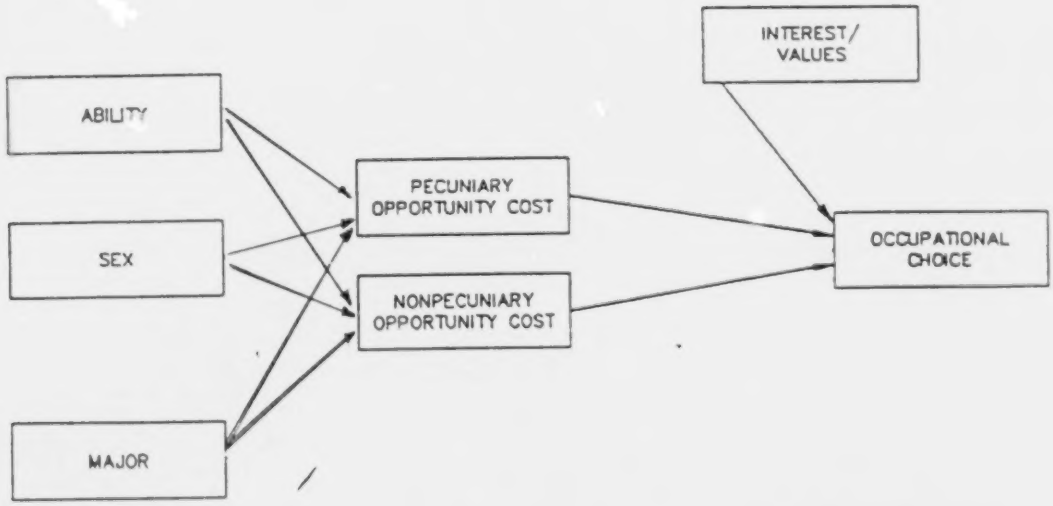

Figure 1. Conceptual Model of Study

Empirical data were collected by means of a questionnaire survey to 532 college students attending the junior and senior level classes at the sample university. Through the stratified cluster sampling method, subjects were chosen in elementary/secondary education and five selected major areas. The path analysis was used to test the hypothetical relations of the causal study model. Pearson product-moment correlations and one-way analyses of variance (ANOVAs) were also used to supplement the path results.

Findings

Effect of Academic Ability on Opportunity Costs

In order to assess the extent that academic ability affects the pecuniary and nonpecuniary opportunity costs, each of the pecuniary and nonpecuniary opportunity costs was regressed on three predictor variables: (a) academic ability, (b) sex, and (c) major specialty. Table 1 presents the results. The results show that the path coefficients (ß) are .15 between academic ability and pecuniary opportunity cost and .12 between academic ability and nonpecuniary opportunity cost.

Because path coefficients (ß) describe the magnitude of change in opportunity cost for each unit's change in academic ability, it is similar to correlation coefficients, but not identical. Path coefficients are actually standardized multiple partial regression coefficients (Bailey, 1982; Pedhazur, 1982). "Standardized" indicates that raw scores are converted to the standardized *z* scores, and "multiple partial" indicates that the

Table 1

Path Coefficients of Three Predictor Variables of Pecuniary and Nonpecuniary Opportunity Costs (*N* = 478)

Dependent variable	Predictor variable	ß	*t*	*p* (two-tailed)
Pecuniary	Academic ability	.15	3.59	.01
	Sex	.16	3.43	.01
	Major specialty	.16	3.27	.01
Nonpecuniary	Academic ability	.12	2.62	.01
	Sex	.08	1.65	.10
	Major specialty	.13	2.70	.01

effects of other variables are controlled. Thus, each path coefficient indicates "the direct effect of a variable hypothesized as a cause of a variable taken as an effect" (Pedhazur, 1982, p. 583).

Examination of Hypothesis 1 revealed the following results. First, the causal relationship between academic ability and the pecuniary opportunity cost was significant, $p < .01$. When sex and major specialty were statistically controlled, academic ability determined significantly the level of the perceived pecuniary opportunity cost. Its effect, the path coefficient (ß), was .15. The positive sign of this coefficient indicates that the more academically able students confront a higher perceived pecuniary opportunity cost.

Because the magnitude of $ß > .05$ typically is regarded as a meaningful path coefficient (Pedhazur, 1982), the direct effect of academic ability on the pecuniary opportunity cost is interpreted as moderate. Considering that the path coefficient indicates a separate effect of a variable (the effects of other variables are controlled), this study interprets $.10 < ß < .30$ as having a moderate effect. However, depending on the purpose of research, the interpretation about the effect size could be different since no firm guideline has been established.

The causal relationships between each sex and major specialty and the pecuniary opportunity cost also were significant, $p < .01$. Both path coefficients (ß) were .16, indicating moderate size of effects. Because female was coded 1 and male was coded 2, its positive sign indicates that male students perceive a higher pecuniary opportunity cost. With respect to major specialty, because average starting salaries

(by field) were entered, its positive sign indicates that students in the major field in which the average salary is higher perceive a higher pecuniary opportunity cost. In summary, each of the three predictor variables (academic ability, sex, and major specialty) appears to have a direct causal effect on the pecuniary opportunity cost.

Second, a causal relationship was found between academic ability and nonpecuniary opportunity cost, $p < .01$. Its path coefficient (ß) was .12. The causal relationships between major specialty and nonpecuniary opportunity cost also was significant, $p < .01$, and its standardized path coefficient (ß) was .13. However, the causal relationship between sex and nonpecuniary opportunity cost was insignificant, $p < .10$.

A path diagram "is a useful device for displaying graphically the pattern of causal relations among a set of variables" (Pedhazur, 1982, p. 581). Figure 2 is a path diagram that displays the path coefficients between three predictor variables and each of the pecuniary and nonpecuniary opportunity costs. Because sex was not confirmed as a significant cause of the nonpecuniary opportunity cost, the hypothesized path between sex and nonpecuniary opportunity cost was deleted.

In summary, it was found that college students' academic ability affected their perceived pecuniary and nonpecuniary opportunity cost, suggesting that the more academically able students perceived higher pecuniary and nonpecuniary opportunity costs. Therefore, Hypothesis 1 was supported.

Pearson product-moment correlations and results of ANOVAs exhibited the same pattern of associations between academic ability and pecuniary and

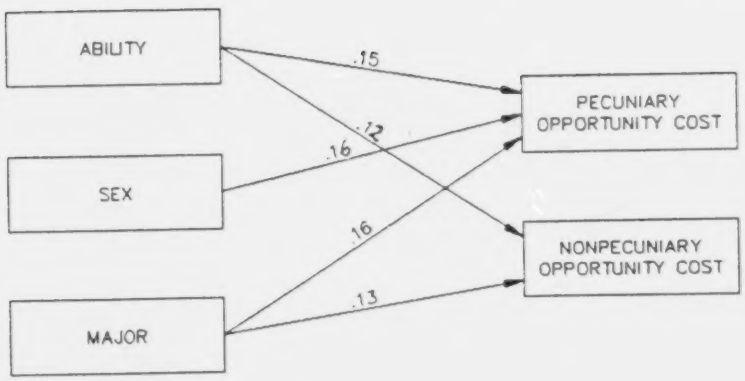

Figure 2. Path Diagram: Predictor Variables and Opportunity Costs

nonpecuniary opportunity costs. For example, according to the one-way ANOVA results, mean z scores of the pecuniary opportunity cost by the low, medium, and high academic ability groups were -.13, -.01, and .16, respectively, $p < .01$. (Note: The score range for each group was determined so that each group contains one third of the whole sample.)

Effects of Opportunity Costs on Occupational Choice

In order to assess the extent that the pecuniary and nonpecuniary opportunity costs affect occupational choice, occupational choice was regressed on all six independent variables in the path model of choice. In the path model of choice, academic ability, sex, and major specialty were conceived as antecedent variables of

occupational choice, which serve as predictor variables of the mediating variables--the pecuniary and nonpecuniary opportunity costs. Because regression of an outcome variable should include antecedent variables (Pedhazur, 1982), these variables were included in the regression. Table 2 presents the results.

Examination of Hypothesis 2 showed the following results. First, the causal relationship between the pecuniary opportunity cost and occupational choice was found to be significant, $p < .01$. Its path coefficient (ß) was .17, implying that the direct effect is moderate. Second, the causal relationship between the nonpecuniary opportunity cost and occupational choice also was found to be significant, $p < .03$; its path coefficient (ß) was .08, implying slight, but still meaningful effect.

With respect to other paths in the model, the causal relationship between interest/values and occupational choice was found to be significant, $p < .01$, even when other independent variables were controlled statistically. Its effect appeared to

Table 2

Path Coefficients of All Independent Variables of Choice (N = 478)

Independent Variable	ß	t test	p (two-tailed)
Pecuniary cost	.17	4.59	.01
Nonpecuniary cost	.08	2.17	.03
Interest/values	-.43	-11.52	.01
Academic ability	.02	.75	.45
Sex	.19	5.32	.01
Major	.15	4.06	.01

be the greatest among independent variables (β = -.43), indicating that interest/value is the most influential cause of occupational choice to enter teaching. The negative sign indicates that students who possess a higher interest in and values of education are more likely to enter teaching; teaching was coded 1 and nonteaching was coded 2.

It should be noted that comparing effect sizes of opportunity costs and interest/values is not the intention of the study. This study considers interest/values as a moderating variable between opportunity costs and occupational choice; it also intends to answer if opportunity costs affect occupational choice when individuals' interest/values are assumed to be the same, i.e., statistically controlled, as if no effect.

Figure 3 is a path diagram illustrating the causal relationships between each of the six independent variables and occupational choice. The proposed path model was slightly modified. Because the paths between both sex and occupational choice and major specialty and occupational choice were found to be significant, their paths were added in the model.

In summary, the causal relationships between each of the pecuniary and nonpecuniary opportunity costs and occupational choice were found to be significant, suggesting that the higher the perceived pecuniary and nonpecuniary opportunity costs, the less likely college students choose teaching as their occupation. Thus, Hypothesis 2 was confirmed.

Again, Pearson product-moment correlations and the results of one-way ANOVAs illustrated this pattern of relationship between two variables. For example,

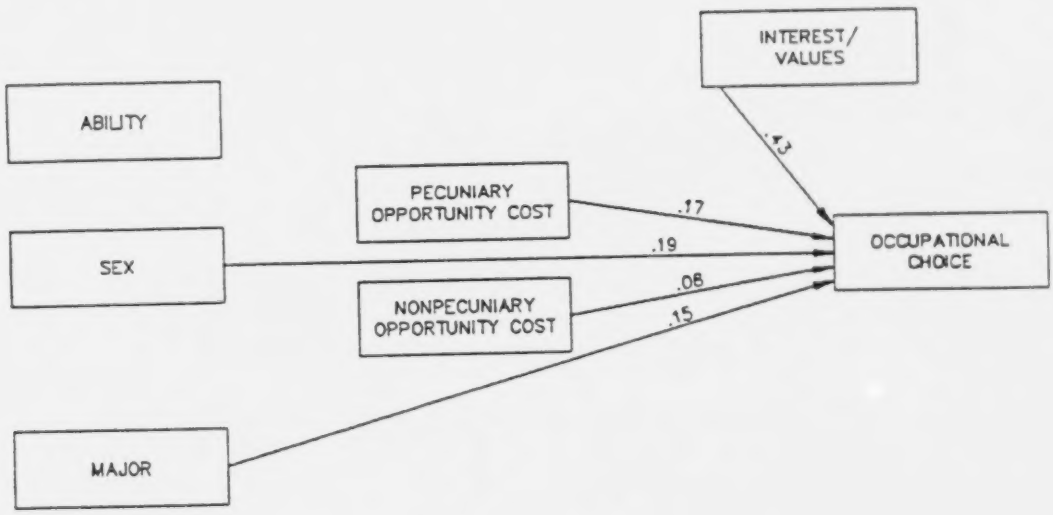

Figure 3. Path Diagram: Independent Variables and Occupational Choice

the pecuniary opportunity cost was moderately and significantly correlated with occupational choice, r = .41, p < .01. The mean z scores of the pecuniary opportunity cost for the potential nonteaching entrants (.27) was higher than that of the potential teaching entrants (-.32), p < .01.

The Revised Path Model of Choice

Because the assumed paths from sex to the nonpecuniary opportunity cost and from academic ability to occupational choice were found to be insignificant from the first-round analysis, it was necessary to reexamine other paths toward nonpecuniary

opportunity cost and toward occupational choice in the model after deleting these two paths. The analysis after deleting any path "may lead not only to changes in the magnitudes of the ß's . . . but also to changes in the results of their tests of statistical significance" (Pedhazur, 1982, p. 616). Table 3 presents the results of the second-round analysis.

The second-round path analysis found the same results as those of the first-round analysis, although the magnitude of the path coefficients and t values of significance were changed slightly. With these results, a path diagram of the revised model of occupational choice is depicted in Figure 4. In this revised path diagram, as reported earlier, the proposed path model was slightly modified: (a) The hypothesized

Table 3

Second Round Path Coefficients (N = 478)

Dependent variables	Independent variables	ß	t tests	p (two-tailed)
Nonpecuniary	Academic ability	.11	2.48	.01
	Major specialty	.16	3.59	.01
Occupational choice	Pecuniary cost	.17	4.72	.01
	Nonpecuniary cost	.08	2.22	.03
	Interest/Values	-.43	-11.53	.01
	Sex	.19	5.28	.01
	Major specialty	.15	4.16	.01

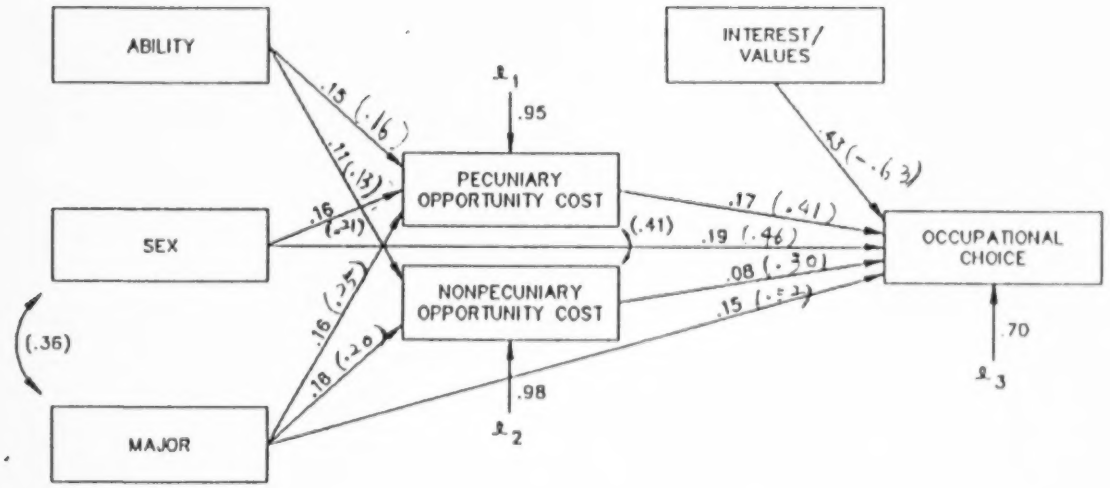

Figure 4. Revised Path Diagram of Occupational Choice.

path between sex and nonpecuniary opportunity cost was deleted; (b) the paths between both sex and major specialty and occupational choice were added in the model.

The Pearson product-moment correlations are presented in parentheses, along with the path coefficients, in order to understand the magnitude of effects. The curved lines with arrowheads at both ends indicate correlations between variables. The three predictor variables of the pecuniary and nonpecuniary opportunity costs were not considered causes of the others. The relationship between the pecuniary opportunity cost and the nonpecuniary opportunity cost also was not assumed to be causal. Thus, rather than the path coefficients, the Pearson product-moment correlations are presented in parentheses. No curved lines between academic ability and major specialty and between academic ability and sex indicate that their correlation coefficients are insignificant, thus suggesting they are independent of each other.

The path coefficients of the residuals (e_1, e_2, and e_2) indicate the upper limits of effects of variables not included in the model. Since it is almost impossible to account for the total variance of a variable, residual variables should be considered. The path coefficients of the three residuals were .95 for the pecuniary opportunity cost (e_1), .98 for the nonpecuniary opportunity cost (e_2), and .70 for occupational choice (e_3). These magnitudes of effects of the residuals are common in many path analyses.

According to this path diagram, it is evident that academic ability affects the pecuniary and nonpecuniary opportunity costs, and the pecuniary and nonpecuniary opportunity costs affects occupational choice. The path mediated by the pecuniary

opportunity cost (academic ability --> pecuniary opportunity cost --> occupational choice) appears stronger than that mediated by the nonpecuniary opportunity cost (academic ability --> nonpecuniary opportunity cost --> occupational choice).

Discussion and Implications

Opportunity Cost and the Issue of Quality

This study has taken a step toward theorizing an explanation about the reason for the quality problem of the teaching force. On the basis of the findings that Hypotheses 1 and 2 are supported, a theory concerning the issue of quality in the teaching force is that the perceived pecuniary and nonpecuniary opportunity costs associated with entering teaching are causally related to the quality problem; that is, the theory explains the quality problem in the teaching force by the causal relationships among academic ability, opportunity cost, and occupational choice. More specifically, because the more academically able college students confront higher perceived pecuniary and nonpecuniary opportunity costs of entering teaching, they are less likely to enter teaching.

That both effects of the pecuniary and nonpecuniary opportunity costs are involved in occupational choice conceptually and empirically explains why low salaries and poor working conditions are the reasons for the quality problem in the teaching force. This aspect is consistent with the previous suggestions that poor working conditions, as well as low salaries, are reasons for the low teacher quality (Bruno,

1986; Carnegie Forum on Education and the Economy, 1986; Huston, 1988; Weaver, 1983).

The Path Model of Choice

The following points are noted concerning the path model of occupational choice. First, the issue of quality is not explained by the direct linear relationship between academic ability and occupational choice in the path model of choice; however, it is explained by the relationships mediated by opportunity costs. It suggests that opportunity cost is a valid mediating variable, and the microeconomic framework using opportunity cost is appropriate in explaining the quality problem of the teaching force. However, the possibility of curvilinear or other types of association between academic ability and occupational choice needs further research.

Second, the combination of all the significant independent variables explains 51% of the variability in occupational choice by being incremented in the order of (a) interest/values, (b) sex, (c) pecuniary opportunity cost, (d) major specialty, and (e) nonpecuniary opportunity cost ($R = .72$, $R^2 = .51$). The high multiple correlation and the explanation of more than 50% of the variability suggest that variables and their paths in the model are appropriate.

Policy Implications

The theory involving opportunity costs developed in this study has potential for solving the quality problem of the teaching force because opportunity costs are largely determined by teacher policy. The policy can alter individuals' pecuniary and nonpecuniary opportunity costs by changing the relative advantages of the salary level

and the working conditions. Other variables of occupational choice such as interest/values, sex, and major specialty are determined without any relation to the features of the teaching occupation; thus, they are rarely altered by education policy. The following points should be noted regarding policy implications.

First, the major policy implications of this study are twofold: (a) The solution of the quality problem should focus on reducing the pecuniary and nonpecuniary opportunity costs of entering teaching for the more academically able; and (b) in order to do so, salary increases and improvement of working conditions are essential because current salaries and working conditions cause high opportunity costs for the more academically able.

Second, because upgrading teacher compensation and creating professional working conditions has been emphasized as critical strategies for facilitating teacher professionalism in the school reform movement, these implications are extended to the direction of the reform movement. The findings of this study suggest that, from the perspective of opportunity cost, more emphasis should be given to compensation involving improved salaries and working conditions rather than regulating standards; also the priority of the policy should be toward attracting the more academically able rather than retaining them.

Third, the finding that the effect of the pecuniary opportunity cost is greater than that of the nonpecuniary opportunity cost suggests that the priority of teacher policy should place increasing teacher salaries before improving working conditions. Considering that reducing class size substantially decreases the potential to raise

teacher salaries, the study emphasizes raising teacher salaries over reducing class size. Further, the survey results of this study indicated that 47% of the respondents were willing to trade 6 to 10 more students for approximately a $9,000 increase in annual salary, based on the average Utah teacher salary. This estimate by college students may be different from that by current teachers, but it suggests that a class size increase may be a feasible alternative to increase teacher salaries, at least from the Utah college students' point of view.

Fourth, the recommended strategies for teacher salary increase include raising the overall level of salaries rather than differentiating salaries according to merit, and raising starting salaries rather than maintaining the current "steepness" of the salary schedule. The survey results suggest that the current initial talent pool of the teaching force could be restructured substantially; thus teachers could be selected from college graduates whose academic ability is higher than average, if the level of the teacher average starting salaries increases substantially (approximately 30% in the state of Utah).

In conclusion, opportunity costs provide an important theoretical reference point for understanding the issue of quality in the teaching force. Therefore, teacher policy should focus on reducing opportunity costs by increasing the overall level of teacher salaries and improving the working conditions to attract more academically able graduates to the teaching profession.

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